

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mark Weichselbaum, Reg. No. 43,248 on 17 December 2009.

The application has been amended as follows:

The claims are amended as follows:

Claim 14 (previously presented). A control unit for sensing an oil level of an engine of a motor vehicle, comprising:

a voltage source having an output outputting an output voltage;

a sensor resistor having a value being dependent on its temperature, wherein said sensor resistor senses the oil level of the engine of the motor vehicle substantially independently of an initial temperature of said sensor resistor; and

a reference resistor connected in series with said sensor resistor, the output voltage of said voltage source dropping at across said sensor resistor and said reference resistor in a connected state, said reference resistor being dimensioned such that a power loss of said sensor resistor is substantially constant for a range of resistance values of said sensor resistor; and

an evaluation unit generating a control signal and connected to said control unit, said evaluation unit having a regulator, said regulator controlling a regulated variable being a voltage drop over said sensor resistor and said reference resistor, and outputting an actuating signal, said actuating signal being the control signal.

25. (Cancelled)

2. The following is an examiner's statement of reasons for allowance:

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Tornare (French Patent FR 2835056 A1) discloses a hot wire oil level sensor with microprocessor, in which a hot wire oil level sensor has an oil level measurement circuit connected across a resistive electrical conductor in thermal contact with the liquid and in series with a precision resistor current sensor controlling a variable duty cycle current generator.

Ory (US Patent 4,825,383) discloses a process and device for measuring the level of the free surface of a liquid, in which a hot wire sensor passes through the free surface of the liquid. The wire is heated by a joule effect up to a temperature T_0 . The supply to the wire is then interrupted for a predetermined time interval. The current passing through the wire at the two instants forming the bounds of this interval is determined by means of an A/D converter which feeds a control and computing unit. From these current measurements this unit derives a value which represents the liquid level.

Glaser (US Patent 4,053,874) discloses an apparatus for monitoring the liquid level of a tank, including a resistance bridge supplied with d-c current having two bridge arms arranged inside the tank, one of which is electrically heated, with the output of the resistance bridge followed by a signal stage with a binary indication and by a current regulator for the heating current, and a testing arrangement for simulating a given filling level, the resistance bridge is supplied from a constant current source whose current is switched from one current value to another upon the operation of the testing device in order to preclude operating disturbances during the testing.

Hayashi (Japanese Patent JP406307912A) discloses an oil level sensor, in which an oil level sensor is arranged in an oil pan and a detection part touches the engine oil when it

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is higher than a predetermined level. A positive characteristic thermistor disposed at the detecting part exhibits negative characteristics in a low temperature region and positive characteristics in a high temperature region and the transition point is set substantially in the center of operating temperature range. Positive characteristics of the thermistor are set to suppress temperature variation even in the high temperature region by increasing the switching temperature. When power is fed through a resistor to generate Joule's heat, the temperature rises differently depending on the presence or absence of engine oil to exhibit different resistance which is detected by a comparator. Since the switching temperature is high, the engine oil level can be detected over a wide temperature range. The claimed invention is judged to be patentably distinguishable (albeit narrowly) over Hayashi, as Hayashi does not claim a reference resistor being dimensioned such that a power loss of the sensor resistor is substantially constant for a range of resistance values of the sensor resistor, as well as an evaluation unit generating a control signal and connected to said control unit, the evaluation unit having a regulator, the regulator controlling a regulated variable being a voltage drop over said sensor resistor and said reference resistor, and outputting an actuating signal, said actuating signal being the control signal.

Hormel (US Patent 4,550,261) discloses fluid level sensor circuitry including a device to control a temperature variable-resistive type oil fluid level sensor in vehicles. The device employs constant current excitation under control of a relay to maximize the sensor's response and employs a shut-off feature to protect the sensor from overheating.

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However, as to claim 14, the prior art of record fails to teach or suggest, singly or in combination, a control unit for sensing an oil level of an engine of a motor vehicle, including:

a reference resistor connected in series with said sensor resistor, the output voltage of said voltage source dropping across said sensor resistor and said reference resistor in a connected state, said reference resistor being dimensioned such that a power loss of said sensor resistor is substantially constant for a range of resistance values of said sensor resistor

in combination with the other limitations of independent claim 14.

Dependent claims 15 – 24, definite and enabled by the specification, are also allowed due to their dependence on independent claim 14.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin M. Baldrige whose telephone number is 571 270 1476. The examiner can normally be reached on Monday through Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Diego Gutierrez can be reached on 571 272 2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Benjamin M Baldrige/
Examiner, Art Unit 2831

/Timothy J. Dole/
Primary Examiner, Art Unit 2831